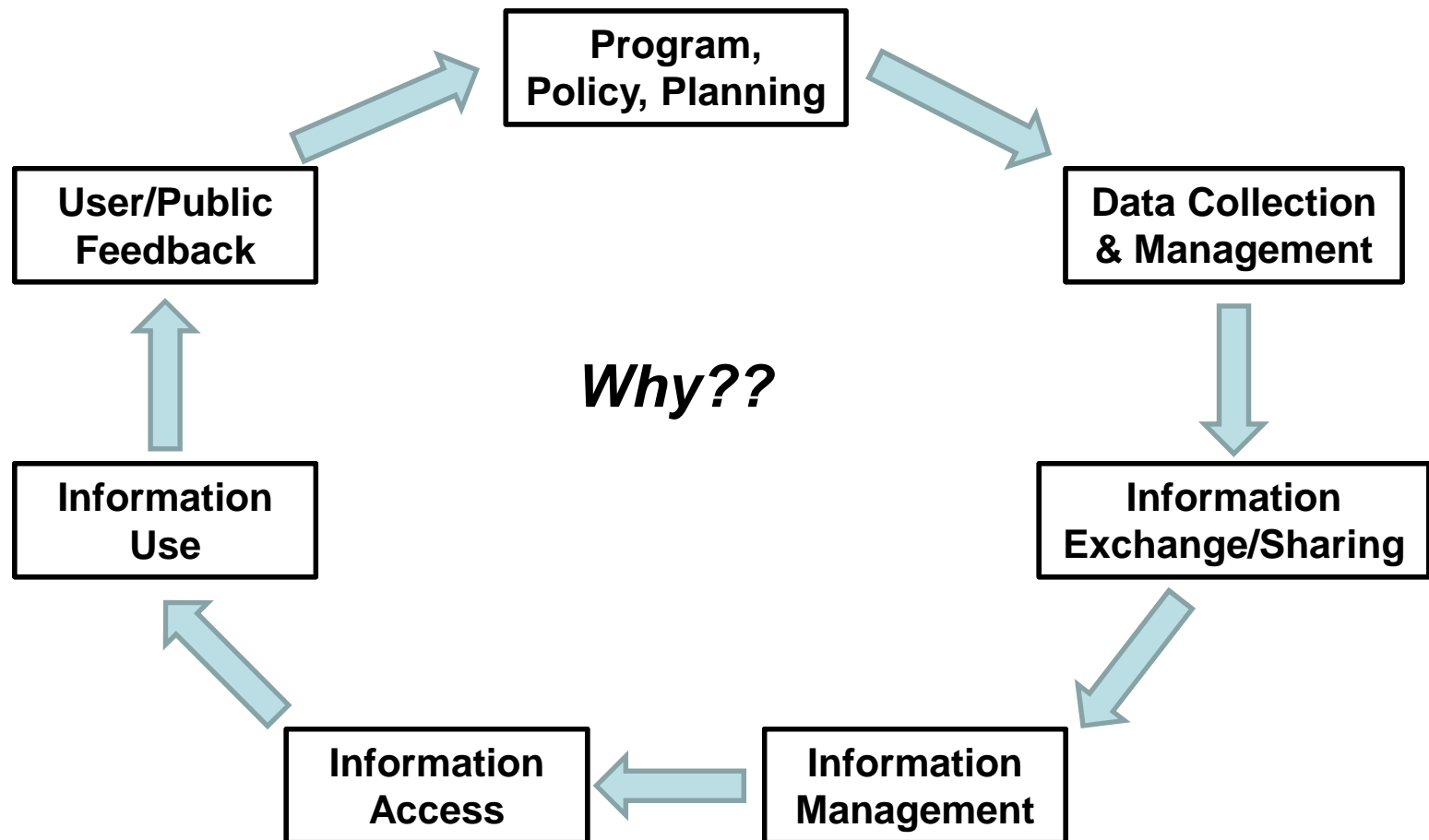# An Environmental Information Life Cycle Framework

9th National Monitoring Conference

Cincinnati, Ohio

April 30, 2014
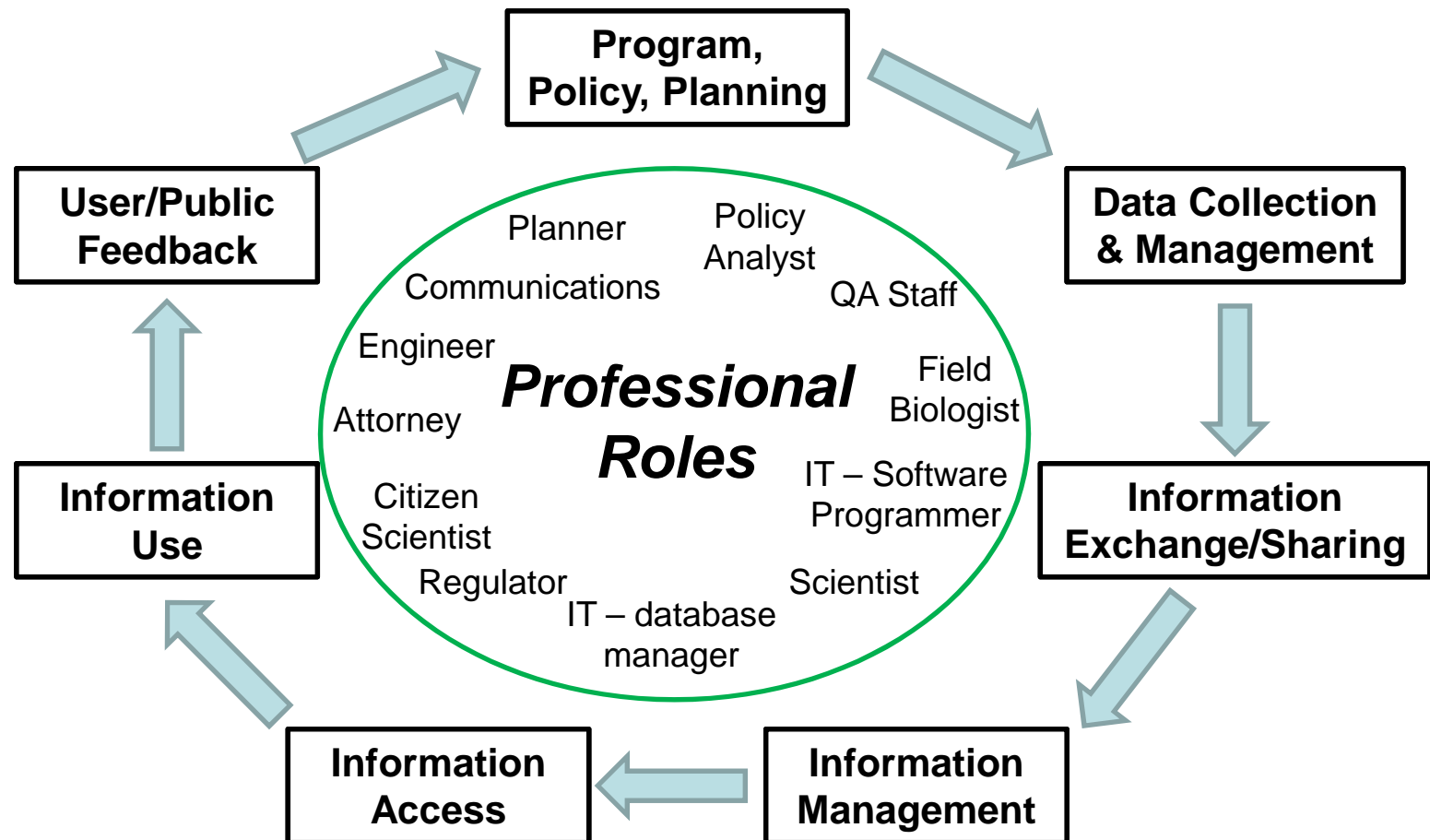
An Environmental Information Life Cycle

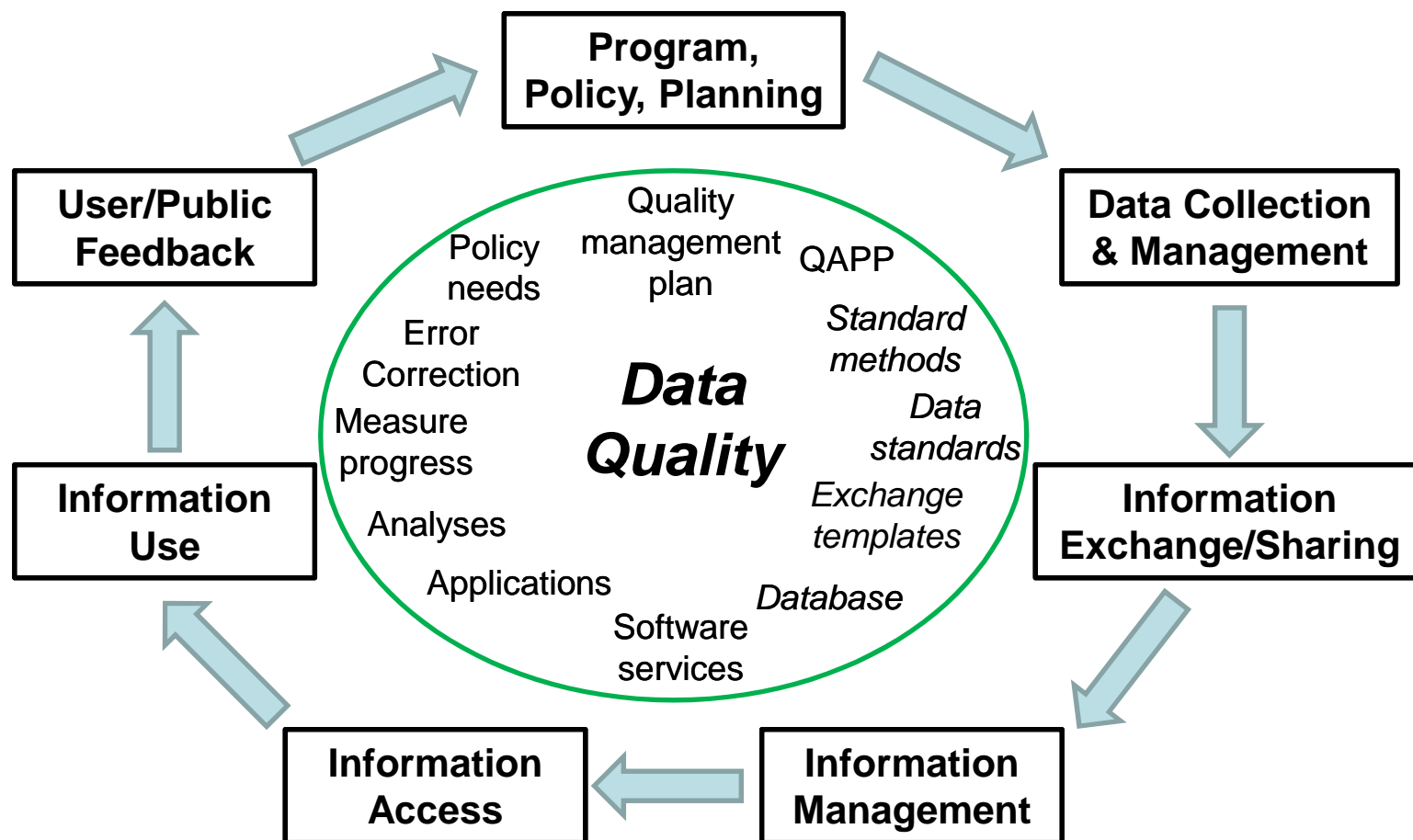# An Environmental Information Life Cycle
Purpose

- **communication** so there is no "black box", just transparency so specialists from different backgrounds can better work together

- increased **understanding** reveals opportunities where data quality should be checked and possibly improved

- more transparency and understanding will lead to more **credibility** of the information, willingness to release it to the public, and acceptance of the information by the public

- **evaluate** environmental information programs for completeness and identify challenges and successes of those programs
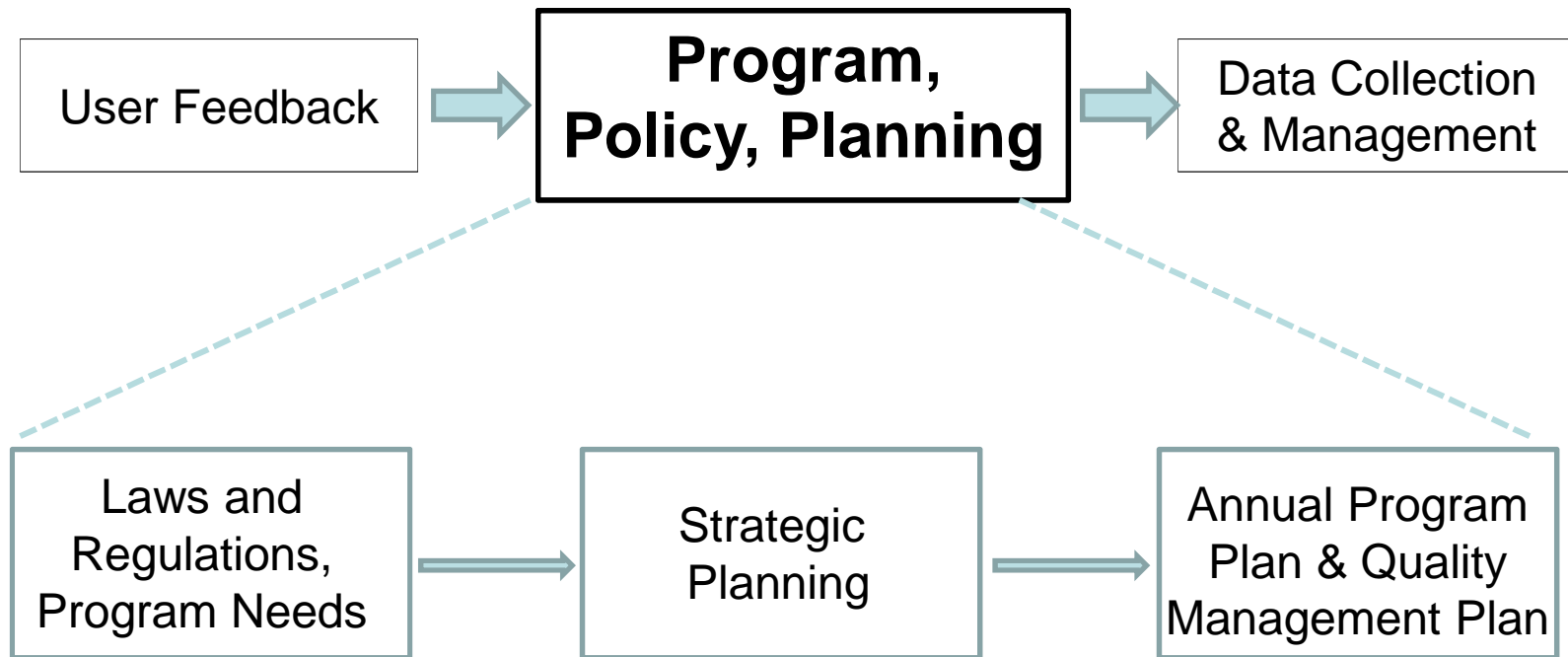
Improve Communication and Understanding

Program, Policy, Planning → Data Collection & Management → Information Exchange/Sharing → Information Management → Information Access → Information Use → User/Public Feedback → (cycle continues)

Professional Roles

Planner, Policy Analyst, QA Staff, Communications, Field Biologist, Engineer, Attorney, IT – Software Programmer, Citizen Scientist, Regulator, IT – database manager, Scientist
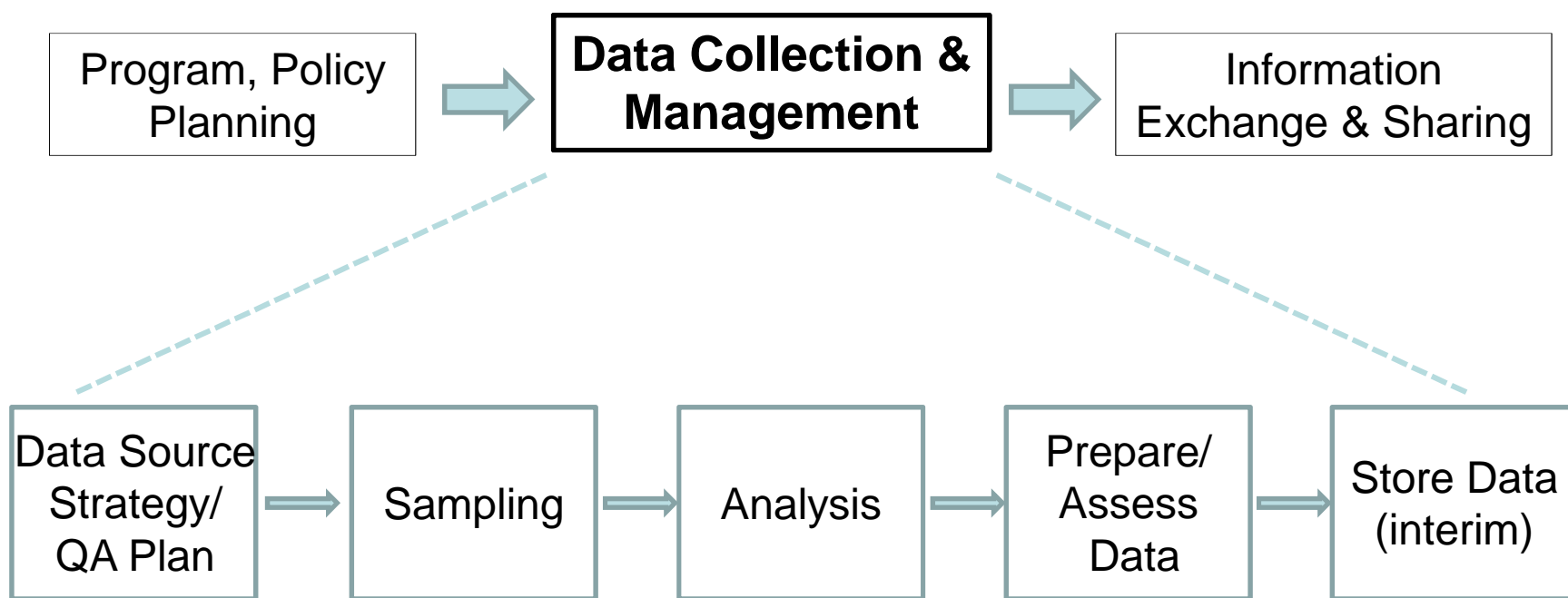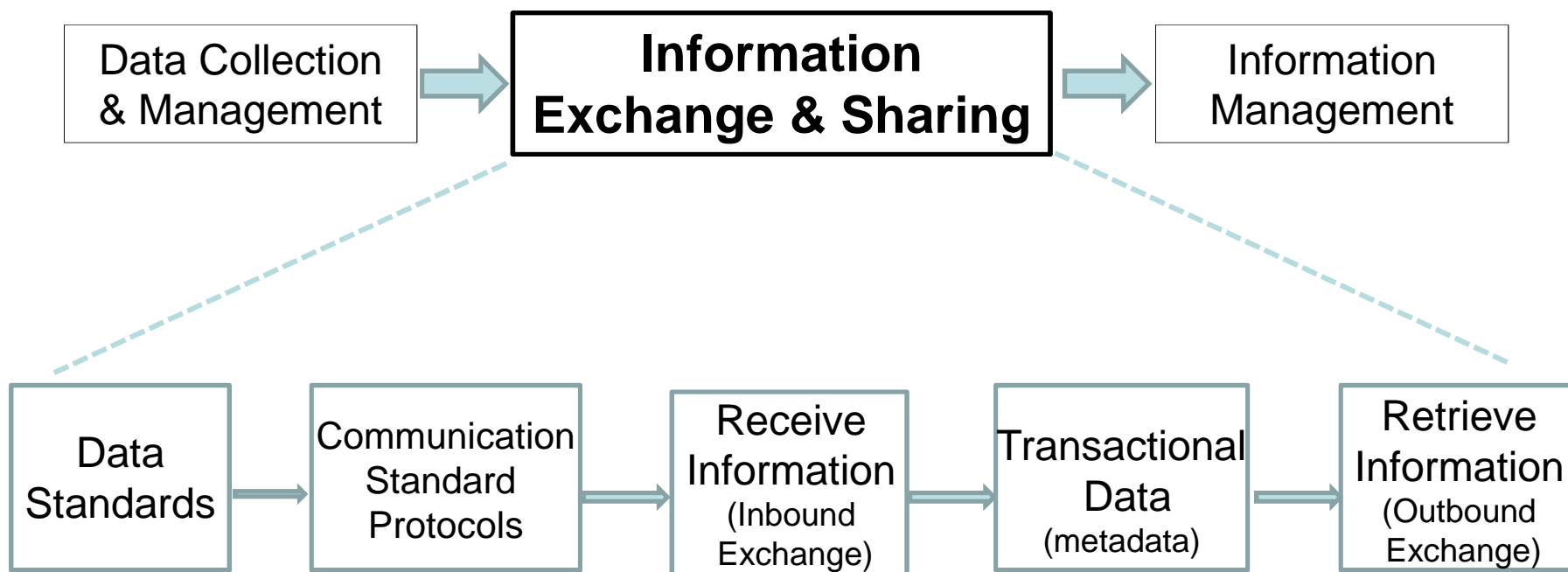
Improve Data Quality and Credibility

User Feedback → Program, Policy, Planning → Data Collection & Management

Laws and Regulations, Program Needs → Strategic Planning → Annual Program Plan & Quality Management Plan

Program, Policy Planning → **Data Collection & Management** → Information Exchange & Sharing

Data Source Strategy/ QA Plan → Sampling → Analysis → Prepare/ Assess Data → Store Data (interim)

```
┌─────────────────┐     ┌─────────────────────┐     ┌─────────────────┐
│ Data Collection │ ──> │   Information       │ ──> │   Information   │
│ & Management    │     │ Exchange & Sharing  │     │   Management    │
└─────────────────┘     └─────────────────────┘     └─────────────────┘
```

| Data Standards | → | Communication Standard Protocols | → | Receive Information (Inbound Exchange) | → | Transactional Data (metadata) | → | Retrieve Information (Outbound Exchange) |

Information Exchange & Sharing → **Information Management** → Information Access

Information Management:
Automated Data Checks (QA) → Store/Manage Data → Ensure Data Retrieval

Information Use → **User Feedback** → Program, Policy Planning

Public & Stakeholder Participation → Submit New Data Citizen Science → Error Correction Reporting
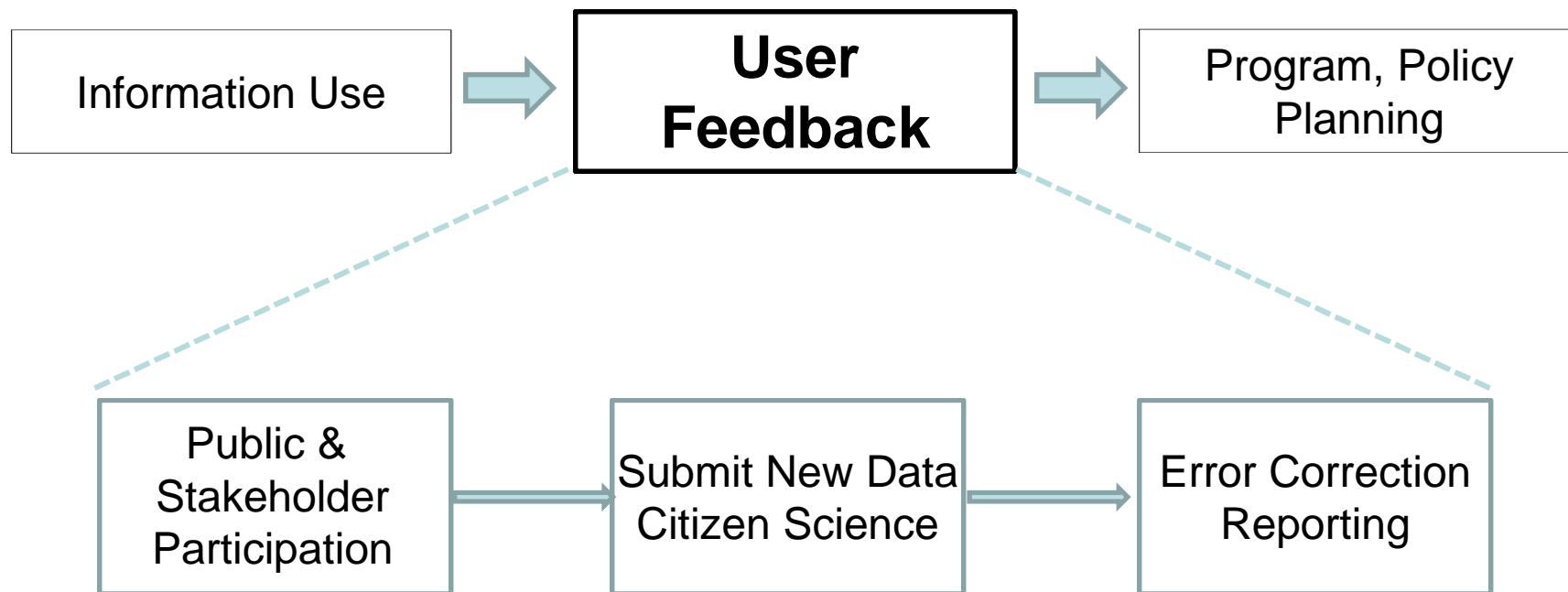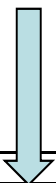
Example: Ambient Water Monitoring

Program, Policy, Planning

States are required to perform water quality assessments, and answer questions like:

- Are waters supporting their designated uses (i.e. aquatic life, recreation, drinking water)?
- Are waters getting better or worse?
- Are investments in water quality improvements having the desired effect?

Data Collection & Management

Water quality monitoring is used to answer these questions. Many types of tools can be used:

- Targeted sampling (to evaluate a specific area of interest)
- Statistical-based surveys (random sampling to understand and measure trends in a specific population)
- Other tools (models, sensors, remote sensing)

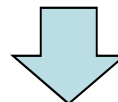Data are often managed for local purposes, but:

- Data are valuable to others who are asking questions
- States are required to consider "all relevant data" (not just their own)
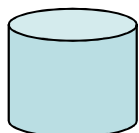
  - Data must be managed in a way that allows for sharing
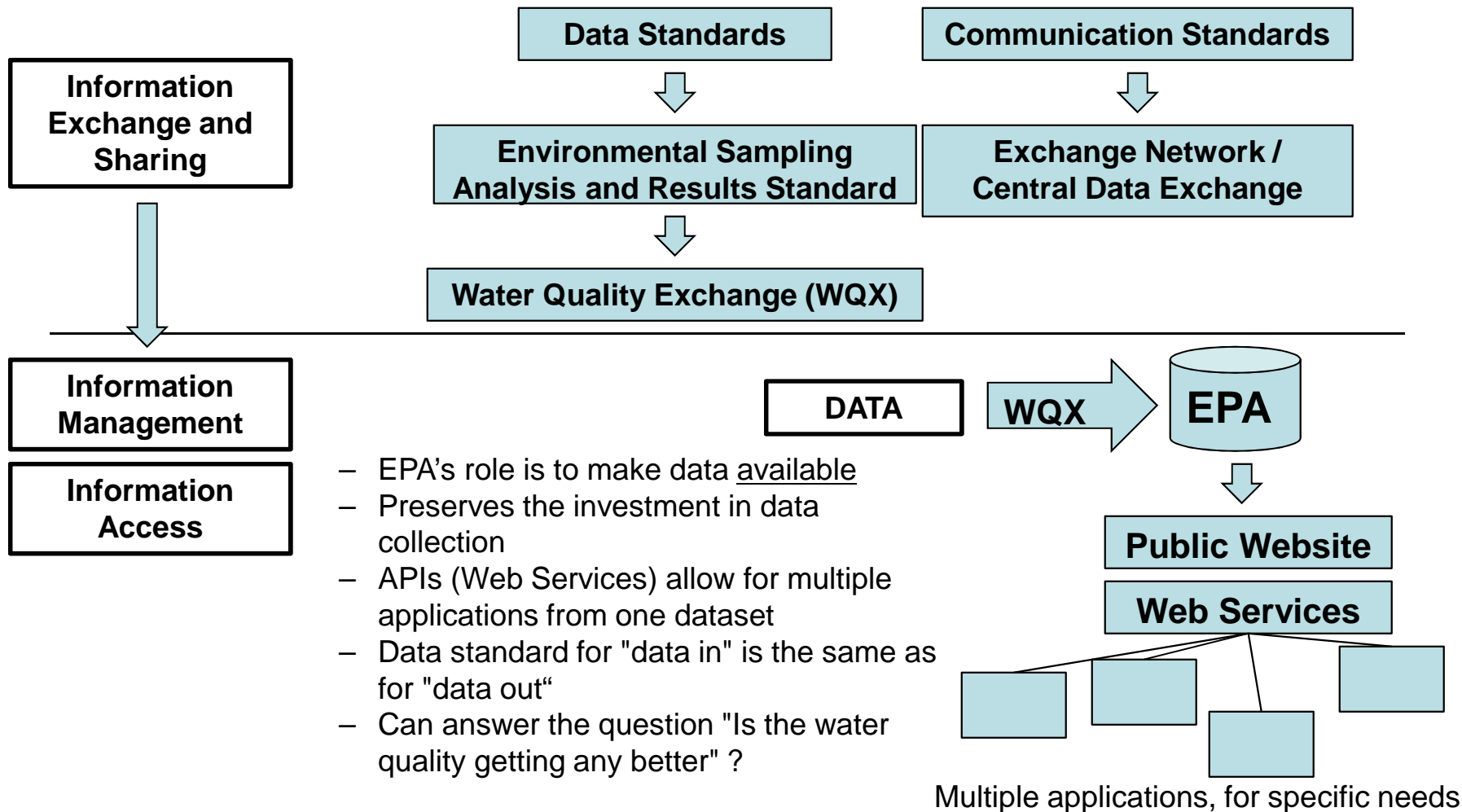
DATA

Quality Assurance

Documentation (metadata)

Sharing and Publishing: Water Data

Information Exchange and Sharing

Data Standards

⇩

Environmental Sampling Analysis and Results Standard

⇩

Water Quality Exchange (WQX)

Communication Standards

⇩

Exchange Network / Central Data Exchange

Information Management

Information Access

DATA → WQX → **EPA**

⇩

Public Website

Web Services

– EPA's role is to make data <u>available</u>
– Preserves the investment in data collection
– APIs (Web Services) allow for multiple applications from one dataset
– Data standard for "data in" is the same as for "data out"
– Can answer the question "Is the water quality getting any better" ?
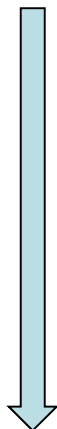
Multiple applications, for specific needs

Information Use/Feedback: Water Data

– Can we answer the questions:
- What is the quality of our waters?
- Is it getting any better?
- What is causing the problem(s)?
- What can we do about it?

Information Use

Public Website

Web Services

Assessment
- National
- State
- Local

Identify Problems
- Pollutant(s)
- Source(s)

Take Actions
- Permit(s)
- TMDL(s)
- Enforcement

Track Progress
- National
- State
- Local

Facility Information
- Permit limits
- Compliance records
- Discharge quantities

User Feedback

Information Quality Guidelines
- Challenge published data
- Submit new data
- Ask for more information

Report an Error
- Facility locations
- Facility discharges to water

Public Participation
- Comments on regulations and permits

5/27/2014

For More Information

Wayne Davis

U.S. EPA Office of Environmental Information

davis.wayne@epa.gov

Roy Chaudet

U.S. EPA Office of Environmental Information

chaudet.roy@epa.gov